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On the basis of responses from (1) 133 of 379 industries in Wisconsin, Iowa, and Minnesota to which questionnaires were distributed, (2) 14 interviews with technicians in Wisconsin and Minnesota, and (3) seven technical schools which submitted copies of their 2-semester English programs, the author correlated a recommended English program with the needs of the technician in industry. Between 57.2 and 69% of the technician's time was being spent in communicative skills--originating letters (6%), writing technical articles (11%), reading technical articles (10.1%), and oral communication (30.1%)--with the balance being spent in manual or purely technical tasks. The study showed that English courses were geared toward secretaries, auditors, or accountants rather than technicians. Little attention was given to reading development, speech, oral and written technical reporting, vocabulary, composition, spelling, or parts of speech. In the proposed program, the first semester includes two weeks of instruction in the writing of business letters, four weeks in developmental reading, and 12 weeks in speech. The second includes instruction solely in the areas of oral and written technical reporting. (DG)

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AN EFFECTIVE ENGLISH PROGRAM FOR THE TECHNICAL SCHOOL

UNIVERSITY OF CALIF.
LOS ANGELES

MAY 24 1968

CLEARINGHOUSE FOR
JUNIOR COLLEGE
INFORMATION

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the Faculty of the Graduate School
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of the Requirements for the Degree
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ABSTRACT

In the rapid growth of the Technical, Vocational, and Adult Schools in Wisconsin, the technical subject areas have kept pace with the constantly changing demands of industry, while some of the academic areas, mainly English, have had little or no revision to meet these new demands. In spite of this fact, there has been a sparcity of research in evidence to show that any attempt has been made to bring the English programs abreast of the technical growth.

For this reason, 379 questionnaires were sent to industries in Wisconsin, Iowa, and Minnesota to determine the English needs of the technician. In addition, 14 interviews were conducted with businesses in Wisconsin and Minnesota while the technical schools were asked to submit their English programs. These results were tabulated and mean percentages of time were found in order that an English program could be formed.

The responses showed that between 57.2 and 69 per cent of the technician's time is spent in communicative skills. They also revealed that technical reporting, a major portion of the job, was equally divided between oral and written reporting. As a result of the survey, a two-semester English program for the technician was designed to meet the specific demands of industry.

TABLE OF CONTENTS

CHAPTER PAGE

I. THE PROBLEM AND DEFINITIONS OF TERMS USED 1

II. THE METHOD OF ATTACKING THE PROBLEM 5

III. PRESENT OFFERINGS OF TECHNICAL SCHOOLS 8

IV. NEEDS OF THE TECHNICIAN IN INDUSTRY 14

V. PROPOSED ENGLISH PROGRAM 35

First Semester 35

Second Semester 50

BIBLIOGRAPHY 62

APPENDIX A. Industrial Questionnaire 65

APPENDIX B. List of Comments 66

APPENDIX C. List of Recommended Textbooks 68

APPENDIX D. Speech Unit Plan 69

LIST OF TABLES

TABLE PAGE

I. Specific Content from Seven Technical Schools 13

II. Responses from Industrial Questionnaires . . 23

III. Responses from Industrial Interviews 24

IV. Research Work 26

V. Desirable English Skills 34

CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

With the rapid growth of the Technical, Vocational, and Adult Schools, it is very apparent that the English Programs in most of these schools are inadequate. In an age in which the technician serves as a liaison between the engineer and production worker, or between management and the working force, the need of an effective language program in technical schools must be recognized. The lack of research in the area of English programs for technical schools has hampered the development of core area subjects and has resulted in the use of outdated programs.

I. THE PROBLEM

Statement of the problem. It is the purpose of this study (1) to show typical English programs now being offered in the technical schools of Wisconsin; (2) to determine the communicative needs of the technician in industry; and (3) to present an effective English program for the technical school determined by questionnaire and interview study of Wisconsin, Iowa, and Minnesota industries.

Importance of the study. Results of the survey showed between 57.2 and 69 per cent of the technician's time is spent in some form of oral or written communication. Further research indicated that the technician is severely handicapped by the lack of ability to communicate. In a recent survey of engineering and scientific technicians, English was listed as the most important course taken in undergraduate work.[1] The ability to explain the product that the technician has developed is, in many cases, as important in the acceptance of the product as is its technical value.

In spite of the important part the communicative skills courses play in the training of the technician, the majority of the technical schools fail to adapt the English program to the needs of expository communication. Of the seven Wisconsin technical schools that responded to the survey, five were devoting over 30 per cent of the time to teaching parts of speech and punctuation. Only one of the schools was teaching oral reporting, while six were devoting less than 20 per cent of the time to written report writing. In this study, an attempt will be made to correlate the recommended English program with the actual needs of the technician in industry.

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[1] Gordon H. Mills and John A. Walter, Technical Writing. (New York, 1962), p. 2.

II. DEFINITIONS OF TERMS USED

Technician. A technician is usually employed in (1) research, design, or development; (2) production, operation, or control; (3) installation, maintenance, or sales. Within the confines of this study, the technicians are serving in the fields of Air Conditioning and Refrigeration, Automotive Technology, Commercial Art, Electronics, and Mechanical Design. The function of the technician in this study is to work under the supervision of an engineer, supervisor, or lead commercial artist performing the manual and reporting tasks in the technical field. He must effectively communicate scientific, sales, or engineering ideas mathematically, graphically, or linguistically.[2]

Technical, Vocational, and Adult Schools. In Wisconsin, Technical Schools are public educational institutions designed to prepare people for employment. In this paper, the technical program of the schools will be examined. This program offers a two-year course and grants an Associate Degree in the fields mentioned above.

Communication Skills Program. In Wisconsin state technical schools, all students are required to complete two semesters of Communication Skills. Each semester is eighteen weeks and covers the basic English skills of reading, writing, speaking, and listening.

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[2] Cathleen Quirk and Carol Sheehan (eds.), Research in Vocational and Technical Education Proceedings of a Conference (The University of Wisconsin Center for Studies in Vocational and Technical Education, 1967), p. 164

CHAPTER II

THE METHOD OF ATTACKING THE PROBLEM

In order to determine what specific communicative tasks are being performed by the technician on the job, a questionnaire was sent to 379 industries in Wisconsin, Iowa, and Minnesota. A copy of the questionnaire is shown in Appendix A. As an instructor at Coleman Technical Institute in La Crosse, I was concerned about our technical English program. As a result I sent 315 questionnaires to Wisconsin businesses and industries, while 46 were sent to Minnesota firms and 13 to Iowa companies. The largest number of questionnaires was sent to Wisconsin firms since the majority of our graduates are employed in Wisconsin. It was further felt that there was a definite responsibility to meet the needs of Wisconsin industry. The following criteria were used in the selection of the firms: the firms had to employ more than 100 employees and had to have technicians in the fields mentioned in Chapter I.

Of the 379 questionnaires sent, 189 were returned, of which 133 were responses with usable answers. Some of the difficulty in the low return of the questionnaires may have been due to the fact that they were sent in bulk mail and as a result would not have been forwarded if the address of the company had been changed. Lack of answers on 66 questionnaires may have been the result of misinterpretation of the first question, which asked how many Coleman graduates were employed. If they answered "None" to this question their tendency may well have been to ignore the rest of the survey. This, however, is pure speculation, and other circumstances may have provided reasons for not returning the survey. The percentage of returns was 45 per cent while the percentage of usable returns was 35 per cent.

The second method of researching the needs of industry was the use of personal interviews. Ten interviews were conducted in La Crosse, while four were conducted in Minnesota. Lasting approximately ninety minutes, the interviews consisted of using the same questionnaire plus observing the technician in the performance of his tasks. The same questionnaire was used so that the interviewee would have a prior knowledge of the information sought. In the interviews, answers were given in greater detail and the opportunity for further questioning existed.

To determine the offerings of the technical schools, twelve technical schools including Coleman were asked to submit copies of their two-semester English programs. Of these, seven schools responded, four giving their units in terms of weeks and days and the other three indicating units of instruction only. A mean percentage of specific units offered was determined, and thus no schools are individually identified.

This method is by no means original or unique, since it has been used in the establishment of technical and general courses in two-year college programs. The American Association of Junior Colleges recommended the following steps in initiating occupational, educational curricula:

> Prior to initiating occupational curriculums or courses, two essential steps are necessary: (a) determining need and (b) determining capability.

The association reports that need is determined by making a comprehensive occupational survey followed by spot surveys.[1]

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[1] Clyde E. Blocker, Robert H. Plummer, and Richard C. Richardson, Jr., The Two Year College: A Social Synthesis. (Englewood Cliffs, N. J., 1966), p. 217.

CHAPTER III

PRESENT OFFERINGS OF TECHNICAL SCHOOLS

The need for an effective English program is nowhere more apparent than in the offerings of the technical schools that responded to the questionnaire. It is for that reason that this paper will attempt to present an English program that will satisfy the demands of industry.

Five of the schools use the text, College English and Communication, by Stewart, Lanham, and Zimmer. The emphasis is geared toward secretaries, administrators, or accountants rather than the technician. Some 35 per cent of the text deals with parts of speech and punctuation and 35 per cent deals with business letters. The balance of the text covers spelling, speech, word origin, and administrative procedures.[1]

Four of the schools indicate that they are using books on technical writing; however, the unit plans submitted show no evidence that any technical English is being taught. If the units that are shown are being used, there can be no time to handle the technical writing or reporting covered in the technical tasks. (Table I, page 13)

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[1] Marie M. Stewart, Frank W. Lanham, and Kenneth Zimmer, College English and Communication (New York, 1964), pp. 1-532.

Teaching of business letters received no mention in the curricula of four schools, while others teach them from one to nine weeks for a mean time of 4.9 per cent. Those schools which teach business letters place emphasis on collection, claim, and personal letters which are directed more to the accountant or secretary than the technician. Letters of application, which are of major importance to the technician in personal advancement, receive scarce attention. Perhaps Mr. Charles Klaus of the La Crosse Telephone Company summarizes industry's views on the importance of such letters when he states:

> Many a technician is refused employment with our company when his letter of application comes in with a complete lack of format, spelling, or information that would prompt us to hire him.[2]

The second item that receives little attention in the technical schools that responded to the survey is comprehensive reading. I cannot question the fact that it is stressed in all schools, but there is no evidence that there are planned courses in reading development. One of the major weaknesses in the technical schools then is reading. The mean amount of time spent on the subject is 11.6 per cent.

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[2] Mr. Charles Klaus, La Crosse Telephone Company, La Crosse, Wisconsin, in an interview, October 16, 1967. Permission to quote secured.

Moreover, the materials used need some attention. Several schools use the Reader's Digest, which may suffice in the high school English class but falls far short of the highly technical language of industry. Two of the schools are using Writing Technical Reports by Rufus P. Turner, a noted author in the field of Technical English. Also included in some instances is a unit in the appreciation of poetry. This unit might well be questioned in reference to the total amount of time allocated for communication skills.

Speech is taught in all seven schools but on a very limited basis. The mean time is 12.1 per cent, hardly consistent with the importance speech has in the world of work. The majority of speeches appear to be of an introductory nature or at best one or two informative speeches. Only one school offered any oral technical reporting and this was done for 1.1 per cent of the course. Yet as this study will show, oral reporting plays a significant part in the day of the technician.

One school offers four weeks of technical writing while another offers three weeks, together accounting for the mean per cent of 9.4 of time spent. Again, the five schools that ignore technical report writing are ignoring a large part of the requirements of industry. The other writing that is offered in the schools composes 6.3 per cent of the course. Unfortunately it frequently appears as a "This is my Life" theme. No doubt many teachers spend time in assigning themes; however, no individual writing units appear in the course outlines.

Vocabulary and spelling receive little individual attention, consuming 4.9 and 5.3 per cent of the time respectively. Most of the work is given from the text with prepared spelling lists from secretarial associations or vocabulary builders from Reader's Digests. It appears that there are very few, if any, attempts to complement the technical areas by teaching spelling and vocabulary from specific subject areas.

The largest per cent of time in the communicative skills courses is devoted to teaching parts of speech and punctuation--a 37.8 mean per cent of time. This mean no doubt is distorted by the use of 19 weeks by one school, but there is an overabundance of pure grammar being offered elsewhere. In view of the fact that students receive at least 11 years of English by the completion of high school, a complete review of identification of parts of speech and all of the punctuation rules seems unnecessary. I cannot argue against the need for knowledge of sentence structure and correct usage, but practical application appears to be the solution rather than pure theory of grammar.

The balance of the courses have been shown as "other" in Table I, page 13. This material ranges from discussions of parliamentary law to panel and group discussions on the sociological aspects of industry. Included in this category are the offerings of two schools of a "Listen and Read" tape designed to improve listening. The amount of time spent on these categories did not appear to be significant enough to list them separately.

If there is one general statement that would apply to the English programs that are now being offered it would have to include the fact that most of the material is irrelevant to the technical courses being offered. If the philosophy of the technical school is to train the individual in the vocational skills he needs to gain immediate employment, then the English program should complement such a philosophy. In the balance of this paper, this chapter will be used to show relationships between what is offered and what is needed. Table I will serve as the referent for future chapters.

TABLE I

SPECIFIC CONTENT FROM SEVEN TECHNICAL SCHOOLS

COURSE CONTENT	MEAN % OF TIME SPENT OUT OF 36 WEEKS
Originating Business Letters	4.9
Comprehensive Reading	11.6
Speech	12.2
Technical Reporting, Oral	1.1
Technical Reporting, Written	9.4
Vocabulary	4.9
Composition - Writing	6.3
Spelling	5.4
Parts of Speech and Punctuation	37.8
Other	6.4
	100.0

CHAPTER IV

NEEDS OF THE TECHNICIAN IN INDUSTRY

"An inarticulate man will never realize his full potential regardless of his technical competence."[1] This statement by Mr. D. J. Stewart, Technical Director for the Mautz Paint and Varnish Company in Madison, Wisconsin, sums up the communication philosophy of the companies that responded to the questionnaire. The idea that English is a very vital part of the training of the technical student is further proven by a recent survey of General Electric technicians and engineers in which 7,000 technical people listed English as the subject, second only to their technical subjects, that helped them most in their careers.[2]

The part that communication plays in the working day of the technician is shown to occupy approximately 57.2 per cent of his time. The balance, 43.8, is spent in manual or purely technical tasks. Table II, page 23, gives a complete breakdown of the various communicative skills that compose this percentage. The balance of this chapter will deal with each individual skill. Substantiation will be added by correlating the results of the written survey with the results of 14 personal interviews and visitations. The results of these interviews are shown in Table III, page 24.

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[1] D. J. Stewart, Technical Director of Mautz Paint and Varnish Company, Madison, Wisconsin. Comment on returned questionnaire, September, 1967. Permission to quote secured.

[2] Mills, p. 5.

Originating Business Letters. Table II, page 23 shows that 64 per cent of the companies indicated that the mean time spent on this task was 6 per cent. Further discussion with the companies revealed that these business letters generally fit into the following categories. First, the specialist must be able to communicate with interplant personnel as well as with other companies to inquire of new or different equipment. Since the technician is involved in maintenance and development, it is obvious that he must be adept in composition of letters of inquiry, biddings, and requests for specifications. Secondly, if the technician works for a smaller company, he must often double as the purchaser of testing equipment or replacement parts. The letter of purchase with its exactness and conciseness must be included in any training program for the technician. Finally, as was mentioned earlier, the technical schools must train the graduate in the correct use of application letters. All of those

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[3] Mills, p. 251.

personally interviewed and several of the written questionnaires indicated that few if any technical school graduates could write a passable letter of application.

As the technician advances in his position, the major portion of his letter writing will be in the form of dictation to a secretary. This factor could well be a reason for the rather low mean time for the task of writing letters shown in the questionnaires.

In addition to letter writing, the personal interviews indicated that the technician spends a fair amount of time in writing of memorandums or inter-office memos which could easily be classified in the business letter category. Since the questionnaire only asked about business letters, the omission of memos could, in speculation, be another reason for the low amount of time given to letter writing.

Writing of Technical Articles: Only 39 per cent of the companies responded to this question. Those that did gave a mean time of 11 per cent. On the basis of this response, writing of technical articles for periodicals or the news media does not appear to have much significance. One reason for this may be found in the method of selection of the sample group. Since the companies chosen employed 100 or more people, the writing of technical articles is probably left to the engineer. Furthermore, technical articles are generally written on topics of product development or innovations; therefore, unless the technician worked directly in a Research and Development section, it seems unlikely that he would be involved in such tasks. Those companies that responded affirmatively had the majority of their technicians working in Research and Development sections.

Only one interview gave any support to this category. A company that employs a staff of eighteen commercial artists and draftsmen in its Art Department gave that department the responsibility for the editing of the company paper on technical matters. The technicians had to be able to gather the information and condense it for a journalistic report. This no doubt could be the work in some of those companies that composed the 39%. Since the commercial artist or draftsman is also involved in the preparation of sales catalogues, there is a strong possibility that there would be some technical descriptive writing done there.

Reading of Technical Articles: Included in 96.9 per cent of the responses, there is little doubt that reading is a vital skill for each technical student. The mean of reading time in the job was rather low considering the responses, but the importance of reading was stressed in the comments and personal interviews. Most of the interviewees suggested a reading time of between 10 and 20 per cent while the survey showed a mean of 10.1. Most of the firms that were interviewed indicated that the technicians were encouraged to read trade journals and product releases for specific job information. Then too, due to the high complexity of the technical vocation, there are unlimited numbers of specifications, instruction manuals, and company directives to follow and understand. Comprehension was the key word in the reading skill rather than speed. Further evidence of the importance of comprehensive reading of technical matters was the fact that 65 per cent of the responses desired further training in reading for the technical graduates. (See Table V, page 34) There can be no questioning the fact that the technician is severely handicapped if he lacks the ability to read for accuracy and understanding.

Oral Communication Tasks. The second largest number of responses was given to this category, for which 95.4 per cent of the companies indicated that a mean of 30.1 per cent of the time was spent in oral communication tasks. Again the personal interview (Table III, page 24) revealed that this estimate might be low by as much as 15 to 20 per cent. Since the technician is a liaison between the production worker and engineer, a good portion of his time is spent in either sending or receiving oral directives. In my personal observation of the various working stations during the 90 minute interviews, it was very apparent that oral communication took a larger portion than 30 per cent of the time. If the technician happened to be working in mechanical design sections, it was not unusual to see him discussing plans with engineers for fifteen to twenty minute periods of time. Technicians working in the plant as testing personnel kept an almost continual technical dialogue going as they reported the results of the test.

Those companies that used technicians as servicemen in the various utility fields indicated that for a substantial amount of time, the technician must be able to meet the public, not only representing the company with courteous service and manners but also being able to explain the mechanical aspects of the problem in laymen's terms.

One of the interviewees explained that a major drawback of the technician was the lack of ability to explain his product to superiors. The failure to stand and justify the product he was developing, handicapped the technician as much as would a lack of the specific skills needed to produce in industry.

Some rather general oral tasks were the conducting of demonstrations, sales meetings, or safety meetings. More than seven companies had their technicians actually work in exhibition booths of county fairs or industrial shows. Again the ability to speak to groups of people was very important.

The skill of effective listening, although not listed on the questionnaire, received enough comment on some of the questionnaires and in all of the interviews to be mentioned in this report. Perhaps the best summary of the feelings of industry regarding this skill was explained by an unnamed respondent who not only quoted Thoreau in his response but concluded with this message. "The listening receiving(sic) aspect is most important. Communication, to be highly effective, must totally encircle sender and receiver." Since Nichols has already proven that 45 per cent of our day is spent in listening, this listening is a significant factor in each job.[4] In the life of the technician, where thousands of dollars may be invested in each project, the ability to listen must play a major role. Each interviewee stressed that the technical student must be given training in listening and following oral directives.

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[4] Karl F. Robinson, Teaching Speech in the Secondary School (New York, 1954), p. 219.

The total time spent in the communicative process is a mean of 57.2 per cent, which is considerably lower than the generally accepted figure of 70.1 per cent.[5] The variation can be speculated about from several different angles. First, there is no way to determine how much time was given to the questionnaires by industry. Although it appeared that the majority of them ended in the hands of those in the best position to evaluate them, there may be room for some doubt when comparing their answers to the national figures. Secondly, there can be little doubt that the national surveys spent more time in a thorough survey of the working stations as well as the individuals involved.[6] For a limited paper of this size, it was a physical impossibility to guarantee the same accuracy. Finally, when personal interviews were conducted with the 14 companies, the mean time of each individual item rose considerably higher than the mean of the surveys. This can be explained by the opportunity to elaborate and investigate each point on the questionnaire more thoroughly than in the impersonal written response.

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[5] Robert E. Levinson, "How to Get Through to People," Nation's Business, Vol. 54 (November, 1966), pp. 92-103.

[6] Stewart, p. 70.

Table III, page 24, shows the responses during interviews with fourteen companies in Wisconsin and Minnesota. These interviews were conducted with the idea of actually visiting a fair representative of each of the major areas of technology listed earlier. In them a significant difference in total time was noticed in the oral tasks and reading of technical articles, while the writing of technical articles received no mention at all.

Each interview lasted for an average of ninety minutes and consisted of not only the oral interview but also a tour of the departments and an opportunity to talk to technicians and observe them at work. I feel the oral figure listed in Table III, page 24, is far more accurate than that listed in Table II, page 23.

The final part of this chapter deals with technical reporting. On the questionnaire, Appendix A, I asked for the amount of time spent in giving technical reports. The comments and the interviews supported the theory that a total of 49.9 per cent of research work is spent in reporting. This is further broken into written reporting, 24.5 per cent, and oral reporting, 25.4 per cent. The term research reporting needs some clarification at this point in that it does not refer to library research and reporting but rather the reporting that results from test data

TABLE II

RESPONSES FROM INDUSTRIAL QUESTIONNAIRES

Task	Number of Responses	% of Useable Responses	Mean % of Time
Originating Letters	86	64	6.0
Writing Technical Articles	53	39	11.0
Reading Technical Articles	129	96.9	10.1
Oral Tasks	127	95.4	30.1
Total Time Spent in Communicative Tasks			57.2
Total Time Spent in Technical Tasks			42.8
			100.0

TABLE III

RESPONSES FROM INDUSTRIAL INTERVIEWS

Tasks	Mean % of Time
Originating Letters	10.0
Writing Technical Articles	00.0
Reading Technical Articles	16.7
Oral Tasks	42.3
Total Time in Communicative Tasks	69.0
Total Time in Technical Tasks	31.0
	100.0

or product analysis.

Two items from the survey point out the importance of technical reporting to industry. First, Table IV, page 26, shows that 84.9 per cent responded to the Written Reporting category while 69.9 per cent responded to the Oral Reporting category. Second, Table V, page 34, shows that 86.0 per cent of the respondents listed "Report Format" as a desirable skill. Complaints in the discussion of technical writing ranged from a lack of neatness in penmanship to a lack of spelling and vocabulary commensurate with the technician's position.

Written Reporting. Formal or informal technical written reporting generally fell into two classifications: description and analysis. In the descriptive classification, the technician may do several possible types of work. In the commerical art department that I visited, a common type of research was the searching for trade-marks to be used by dealers of the company throughout the world. For obvious reasons, the technician had to be well aware of those marks already in use and had to be able to combine or create new designs. The written report gave the idea of the design and supporting reasons for choosing it. Furthermore, proof that it was not used by another dealer had to be given to insure there would be no legal complications.

TABLE IV

RESEARCH WORK

Task	Responses	% of Useable Responses	Mean % of Time
Written Reporting	113	84.9	24.5
Oral Reporting	93	69.9	25.4
Communicative Tasks			49.9
Technical Tasks			50.1
			100.0

A further type of descriptive reporting occurs in maintenance work. Two of Wisconsin's largest telephone companies report that their technicians must report every line breakdown that occurs, with explicit instructions on the repair of the problem or recommendations for the next shift. In the case of the night shifts where there is often no engineer on hand, the importance of the report is enlarged.

Mr. Klaus, Chief Engineer, La Crosse Telephone Company, stated that this reporting ability was a major factor in the company.[7] In this instance, clarity, conciseness, and accuracy of the language are essentials of the report.

Those technicians who must meet the public and perform service work away from the plant must also report the description of the problems and the action taken. In most cases, this is done on standard forms. At the end of the month the technician may well prepare a formal summary report ranging from one to ten pages.

In this descriptive classification the use of the written report to list investigative tasks or describe research and development of a new product is also in evidence. According to personal interviews, the importance lies in the ability of the technician to accurately and persuasively sell the product to his superiors. Strong logic and deductive reasoning are a must in the report showing a new development, according to Mr. Gilchrist of Control Data, Spring Grove, Minnesota.[8] The point that a new product might never be developed because of a lack of ability to report on its initial stages must not be overlooked.

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[7] Mr. Charles Klaus. Permission to quote secured.

Product changes that must be reported on blueprints or product specifications are another source of descriptive report writing for the technician. At a recent interview in a large drafting and development section, each print had over 10% of its area devoted to instructions. The ability to accurately instruct the user of changes is as important as the print itself. An interesting observation was of the difference in terminology of the lead draftsmen and the trainees. For example, the prints produced by lead men often used terms such as "lubricate" or "correct" compared to "oil" and "change". Some weaknesses outside his technical ability that kept a draftsman from advancement were shortcomings in spelling and ability to write instructions clearly and concisely. These points certainly give credence to the correlation between ability to communicate and advancement.

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[8] Mr. Gilchrist, Plant Manager, Control Data, Spring Grove, Minnesota, interview, November 2, 1967. Permission to quote secured.

Finally, the descriptive type of research reporting is present in the writing of sales brochures. A smaller company almost exclusively uses its technicians to write not only the descriptive literature of the product but also the instruction sheets and/or specifications. For larger products such as pop coolers, there may be a total of eighteen to thirty pages, while the smaller items can be easily handled in one page. Whatever the case may be, the emphasis must be on the end result, the use of the material by the consumer or maintenance man.

The second major category of written reports is the reporting of test analysis. More than likely this will be done on printed reports on which the technician is responsible for accurately reporting whatever information he receives from the tests. Some of the larger companies that were interviewed made extensive use of computers to handle detailed work, but there were still many work stations where physical tabulating and reporting were being done by the technician. In particular this was in evidence during a tour of Trane Company, La Crosse, Wisconsin, where air conditioning specialists were running tests almost continuously. Each specialist reported directly to a lead technician or engineer and kept a constant record of temperature changes.

Written reporting includes not only the formal research reporting that most of us are familiar with but also the daily reporting that the specialist must perform. The amount of time spent in reporting these tasks is directly related to the rank the technician has. Technicians in the research and development areas will no doubt spend the majority of their time in pure research and thus have a greater need of technical writing. For the purpose of this paper and any subsequent project on the development of an English program, the emphasis must be heavy on the teaching of the correct writing of technical reports.

Another factor of report writing that should be mentioned is the necessity of accurate spelling. Table V, page 34, shows that 69.8 per cent of the companies indicated a need for teaching spelling to the technician. Every interview supported this factor, and comments on the questionnaires stated that the technician's spelling ranged from "poor" to "atrocious." Again the personal observations showed the devastating effect a misspelled word had on a clear blueprint that would have been sent to a customer. An unnamed manager summed up the entire philosophy of the importance of the written report in these words:

> An individual's work is psychologically questioned if his work is sloppy, made up of obvious errors, and contains spelling errors of simple, common words. If there are errors in the written presentation, there is an inference in the original work of errors.

Oral Reporting. Table IV, page 26, shows that 69.9 of the companies responded and showed a mean time of 25.4 per cent given to oral reporting. The interviews definitely showed the oral reporting to be a major portion of the research work performed. It was nearly impossible to separate the conversational reporting from the actual reporting to a superior or subordinate. However, one major point to consider is the levels of appropriateness in the language the technician encounters. Even though the oral tasks he may perform are of a very informal nature, he nevertheless must be able to comprehend and speak in the vernacular of all levels from the engineer and the administrator to the worker on the line. A strong preparation is a must in the skills of basic vocabulary building. This fact is additionally supported by the fact that 75.4 per cent of the industries indicated Vocabulary as a desirable skill. (See Table V, page 34) There is further evidence in the comments of the questionnaires that state that many of the industries have their own terminology and the graduate must have the capability to learn terms peculiar to his particular field.

Whereas the written report is a permanent record of the technical research being performed, the oral report more than likely is an on-the-spot report of progress being made. According to the interviewed supervisors, it is a common occurrence to be called into a director's or manager's meeting and asked to explain the progress of an experimental or developmental project. The need for training in short demonstrative or impromptu speeches is very apparent in this function of the semi-professional worker. The ability to think logically and quickly is an advantage to the technician that must perform in the highly complex fields of today's industry.

The more formal oral reporting involves the effective use of graphic materials. Some training that will aid in their preparation must be a part of the program. Once again, this may vary with various fields, but on the whole, the technician must be able to illustrate his presentation with whatever visual or communicative aids he has at his disposal.

The oral report fills the same categories as the written, that is, reports of description and analysis. To repeat the various forms would be redundant; however, the major difference seemed to be one of preparation and delivery. While the written report can be prepared, reviewed, and then rewritten, the impromptu report must be logically and clearly given on the initial attempt. Furthermore, there is no doubt that there will be differences in terms of language, color, and effect between the oral and written reports.

In conclusion, this chapter has shown the needs of industry. The opening quotation of the chapter, "An inarticulate man will never realize his full potential regardless of his technical ability," seems to be the key statement. The concluding chapter of this paper will attempt to realize these needs of industry and present a technical English program that will not only satisfy them but also give the technical student the skills and confidence he needs to succeed in his industrial endeavors.

TABLE V

DESIRABLE ENGLISH SKILLS

Skills	Per cent of Responses
Spelling	69.8
Report Format	86.0
Reading	65.0
Vocabulary	75.4

CHAPTER V

PROPOSED ENGLISH PROGRAM

This concluding chapter will present a general plan for each major category in Table III, page 24, stressing those items that this study has indicated as major needs of industry. The proposed program is correlated with the needs of industry and will be presented in the order employed in Chapter IV. This means that actual sequence will have to be decided upon by the individual or the school.

The importance of syntax, vocabulary, spelling, and composition can never be overlooked in any English course. Thus, these areas of study will be an integral part of the English program. Spelling and vocabulary lists should complement the technical programs. For example, those English classes dealing with electronics students should draw their spelling and vocabulary from lists of words submitted by the electronics department. This will assure a meaningful substance to this phase of the English program and reinforce technical subject matter as well. Effective written composition must include proper structure and organization of sentences as well as paragraphs, and can be included in several of the units presented--mainly, Composition and

Reading, and Research Reporting. As is true in all areas of General Education, the English department must be constantly aware of trends in the technical areas and complement them wherever possible.

FIRST SEMESTER

Business Letters. There are two factors which dictate the teaching of business letters. First the cost of the business letter has climbed to $2.49 per letter.[1] This alone should be sufficient reason for preparing future managerial people in the efficient use of letter writing. Secondly, in the survey, industry indicated that between 6 and 10 per cent of the technician's time is spent in the preparation of business letters. In recognition of these facts, a two-week unit in business letters represents approximately 6 per cent of the two-semester course.

A unit in letter mechanics may include some rhetorical information such as purpose, tone, reader orientation, and organization. An opportunity to use basic elements of syntax and composition techniques can easily reinforce basic English skills. The rules of courtesy, clarity, naturalness, and compactness have their place not only in business letters but in other forms of technical writing.[2] With the stressing of the correction of errors in sample letters, appropriate usage and effective grammar can be incorporated in this unit.

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[1] Sylvia Porter, "Cost of Business Letter Soars to $2.49 Average," La Crosse (Wisconsin) Tribune (November 13, 1967), p. 5.

The second part of the mechanical aspect of writing must cover the various parts of a letter. These are an essential part of the mechanics of the letter. Realizing that all of these parts may not appear in each letter, the student must nevertheless be thoroughly familiar with these seven parts: (1) heading, (2) inside address, (3) salutation, (4) body, (5) complimentary close, (6) signature, and (7) identification line.[3]

Finally the teaching of mechanics should include familiarization with various styles. Since the technician will have to adapt to the company he may become associated with, a brief mention of the block, semi-block, and balanced block should be made.[4]

The second major element to be taught in this unit should be an acquaintance with the various types of letters the technician may use on the job. According to Chapter IV, the survey shows that he will generally use letters of inquiry, purchase, and application.

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[2] Harold J. Janis, Writing and Communicating, (Boston, 1960), pp. 67-68.

[3] George W. Crouch and Robert L. Zetler, A Guide to Technical Writing, (New York, 1954), pp. 19-56.

[4] William A. Damerst, Resourceful Business Communication, (New York, 1966), pp. 77-78.

In a letter of inquiry, the technical student must concern himself with several items including conciseness and thoroughness. The student must also be able to distinguish between letters of request and those of inquiry as well as use the various methods of replying negatively and positively.[5]

The letter of purchase not only needs the accurate description of the inquiry letter but also must include the dates of shipment, terms, methods, and price.[6] Since most companies use their own printed purchase orders, the student should investigate various suspense and follow-up systems.

Finally, the letter of application must receive major attention in this unit. Two components must be emphasized in the letter of application. First, the student must be able to write an appealing cover letter. Secondly, he must be able to complete an effective resumé. There are numerous schools of thought on the contents of a resumé, but generally it must include the following categories: personal data, education, experience, and personal references.[7]

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[5] Damerst, pp. 29-37.

[6] W. O. Sypherd, Alvin M. Foutain, and V. E. Gibbens, Manual of Technical Writing. (Chicago, 1957), p. 67.

As this paper is not intended to give an extensive plan in the teaching of each unit, it will suffice to mention that the student must be given individual attention and practice in writing letters of application.

Reading and Composition. The high per cent of responses in this category (96.6) and the amount of time (11.0 to 16.7 per cent) devoted to technical reading on the job warrant a four-week unit on developmental reading. Since the teaching of reading lends itself to the teaching of basic composition skills, the integration of the two at this point seems natural.

From my own experience in Vocational and Technical Education, there will be a need of a remedial reading and language clinic to aid those with obvious and serious reading difficulties. The language laboratory can easily be established and can be used to aid those technical students recommended by their teachers through the use of standardized testing programs. Emphasis should be placed on the correction of grammatical weaknesses and structural errors.

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[7] Damerst, p. 442.

The content of the reading unit must utilize the basic concepts of reading in the development of comprehension and composition skills necessary to the technician. A brief period of reading readiness is suggested by Gordon Funk in an article on vocational arts, "Reading and Industrial Arts: Interview." He further states that there are three types of reading readiness tools that are available in the industrial classroom: labeling, identifying, and demonstrating. In labeling, tools are given their correct names at the beginning of the semester, a step which correlates with word recognition in early reading training. Identifying, such as using a floor plan with equipment located and numbered, correlates with syntax and sentence patterns. Finally, demonstrating gives the student the opportunity to see the tool in operation and its importance to the entire process. Likewise, he can visualize the word in context and see its relation to the whole composition. Because the technician sees these skills in the classroom and uses them on the job, they appear to be an excellent point of departure for the instruction of reading improvement. Funk ends the article with an appeal for English teachers to work closely with technical instructors and correlate writing and reading skills with technical course content.[8]

There is no definite order to the reading skills that follow, but certainly they must be included in any approach to the problem. Word Meaning, Recognition, and Grouping allow the student to grasp the main idea of the word, the sentence, or paragraph. A striving for contextual meaning and analysis of words or units of words will give the student a basis for comprehension. Even though the technician cannot be expected to skim or speed read on the job, he should have the opportunity to acquire this habit for fast selection of major points of emphasis in his speciality. Since the technician uses outlining as a major portion of formal technical writing, this unit is a logical place to introduce outlines. By outlining technical reading materials, the student can see practical examples of composition, topic development, and support.

A reading unit would be incomplete without an investigation of major types of discourse that the student will continually use in writing and reading. J. D. Thomas, writing in Composition for Technical Students, states that future technicians should become familiar with exposition, description, narration, and argumentation.[9]

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[8] Gordon Funk, "Reading and Industrial Arts: Interview." Improved Readings in Secondary Schools: Selected Readings edited by Lawrence E. Hafner, (New York, 1967), pp. 320-329.

In technical exposition as well as other forms of composition, there are several basic elements that must be taught. A thesis sentence, logical development, supporting evidence, and an effective conclusion are basic parts of exposition. Methods of deductive reasoning must be introduced and use made of these methods as the basis of future work. Paragraph development, definition, and transition are other essential parts of exposition that must be covered.

From the survey it appears that the two most important minor functions of discourse are description and argumentation. Again enumeration and expansion of details are the highlights that must receive attention. Argumentation will receive further attention in the second semester of research reporting.

Speech The survey indicated that between 30.1 and 42.3 per cent of the technician's time is spent in oral communication. Further observation and interviews tend to support this fact and give a definite picture of what distinctive types of speech training the technical student needs. The speech unit will cover a twelve week period and should include theory and practice. In the speech unit, the student will be given ample opportunity to practice effective organization and support of thesis or purpose sentences. The balance of this section will show those elements that should be taught during the twelve weeks. The material will serve a two-fold purpose. First, it will correlate the needs of industry with the courses offered; secondly, it will give the student a basis for future work in the second semester unit on oral reporting.

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[9] J. D. Thomas, Composition for Technical Students. (New York, 1965), p. 127.

An effective speech course must include a unit on listening. Since the technician spends a great deal of time in receiving or giving oral directives, it is imperative that he be trained for listening effectively. The student must be aware of the three functions of listening, (1) for enjoyment, (2) for information and inspiration, and (3) for improving the understanding and use of principles of communication and critical thinking.[10]

The student must develop the ability to listen critically, whether it be in a person to person relationship or in the midst of an audience. He must be fully aware of Nichols' ten universal bad listening habits and the methods of eradicating them (See Appendix D). Finally, listening must be incorporated throughout the speech unit. Constant efforts to improve the power of concentration through effective listening will enhance the future success of the technician.

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[10] Karl F. Robinson and E. J. Kerikas, Teaching Speech Methods and Materials. (New York, 1965), P. 261.

Without going into the methodology or mechanics of presenting the speech unit, one must mention certain basic concepts included in the theory of speech. Time should be devoted to the discussion of subject, purpose, and adaptation of the speech to the audience. Again, the basic concepts of composition are stressed with emphasis on the finding of materials, organization, and developing methods of support. Outlining, which is necessary in all writing and speaking situations, should be expanded to include complete topic and sentence outlines for each speaking assignment. Finally, the use of visual as well as vocal communication should be stressed.

In a twelve-week unit approximately five oral projects could be assigned which would fulfill the specific objectives mentioned above. These would consist of two or more informative speeches, one persuasive speech and one small group discussion.

There are two major skills that need to be taught in order to train the technician to speak effectively. First, the student must be able to display effective physical behavior in all aspects of the speech. Skills in audience contact, attitudes, movement, gestures, and facial expressions must be gained by the speaker and covered during the unit. Secondly, the student must be trained in effective vocal communication. Improvement of physical characteristics of the voice, plus development of vocal variety in terms of pitch, volume, rate, and force, must be given attention.[11] (See Appendix D)

The speech to inform is one of the tools that will enable the technician to perform his duties better. According to Alan H. Monroe, Purdue University, there are three types of informative speeches which occur frequently. These three, which seem to fit the exact needs of the technical student, are as follows: (1) reports--scientific or technical; (2) instructions; and (3) lectures.[12] Since the technician is going to be placed in situations where he will face these types of speeches, he must have a thorough understanding of the purpose of the informative speech. According to Monroe, the major purpose of the informative speech is the giving of a clear and concise understanding of the ideas presented--a major objective of technical exposition.[13]

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[11] Robinson, p. 309.

[12] Alan H. Monroe, Principles and Types of Speech. (Chicago, 1962), p. 357.

Organization and the concreteness, appropriateness and accuracy of language are all details of the speech preparation that need to be enumerated for the student. Special emphasis must be given to the steps of organization of the informative speech. The attention-gaining introduction, the need, development of ideas, and the informative summary are the steps that must be taught prior to giving this speech.

The second type of speech that will play an important part in the preparation and activities of the technician is the speech to stimulate or to actuate through emotional stimulation. This speech, primarily to stimulate or inspire, is often used in sales presentations. It fits the needs of the technician who may be called on to handle exhibits or serve as an assistant during a sales presentation. That this type of assignment exists has been affirmed by the oral interviews. The technician, who is often closer to the technical aspects of the product than the salesman, is often used as a technical consultant during a sales situation and must be able to show the product in a logical and appealing order. Some of the features of this type of speech which are of major importance and need to be taught are phraseology, specificity, concreteness, and clarity. The use of comparison and contrast, motivation, and imagery must also be covered. Acquainting the student with the various types of imagery as listed in Monroe's Principles and Types of Speech will form a basis for the extensive oral reporting in the second semester.[14] The speech to stimulate adds the visualization step. Again the student must be aware of the entire process of speech to stimulate and be able to convince the listener that his topic or project has a definite use or place in the entity of the operation. This obligation exists when the technician must persuade a supervisor of the value of an individual part within its relationship to the whole product.

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[13] Monroe, pp. 393-395.

The speech to convince is a logical development from the speeches to inform and stimulate. Although this speech combines many of the principles of the previous two speeches, there are several additional skills the technical student must master. He must be aware of the possible audience reactions and adapt his presentation accordingly. He must also be able to use concrete facts, and prepare vivid illustrations to provide sound, logical reasoning.

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[14] Monroe, pp. 393-395.

The fourth type of speech the student will meet is the demonstration speech, which fulfills two needs of the technician. First, it will give him a tool for further proficiency on the job, since he must constantly make demonstrations to subordinates or learn from demonstrations from superiors. A thorough training in this speech will assist him in the critical skills of speaking and listening. Second, it will give him another basis for future technical reporting. Since demonstrations make use of visual aids, this type of speech presents the first opportunity to use a technical apparatus or mechanical device during a speech. Again some additional concepts must be presented in this unit. Simplicity, vividness, working order of the apparatus, and useful meaning of the visual aids must be attended to.

Finally the speech unit should allow participation in discussion activities. Since the discussion or conference type presentation will be taught in the second semester, this unit will serve as a basis for familiarization. If we recognize that discussion is the cooperative deliberation of problems by persons thinking and conversing together, it is easy to realize this type of speech fulfills an essential need of the student. It also answers a need of the student to cooperate and think reflectively and inquisitively--skills of vital importance to the technical student.[15]

While the technical student must be made aware of the four commonly recognized types of discussion, (1) Round-Table Discussion (Committee), (2) Panel Discussion, (3) Symposium, and (4) Lecture, the emphasis should be placed on the Round-Table Discussion since it best represents the type of activity he will encounter on the job. In this type of discussion group, the group works together in an effort to analyze the problem before them and reach a satisfactory solution.[16] According to 12 of the 14 firms interviewed, this technique is commonly used in industrial product development and research. The ideas of defining, analyzing, suggesting solutions, and evaluating solutions can reinforce technical as well as academic areas.

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[15] Robinson, p. 190.

[16] _Ibid_., pp. 407, 451.

When this first semester is completed the student will hopefully have learned the basic concepts of oral and written composition. He has been made aware of the various approaches to the development and improvement of reading, and of the necessary forms of business letters. While these units have been correlated with the needs of industry, they have also been designed for several other purposes. First, they give the student a basis for the second semester, which deals wholly with technical reporting. Secondly, they are designed to show the student a definite correlation between academic and technical subject areas. In previous courses it has been seen that the technical student can see little value in an academic subject like English unless is specifically relates to his core area. By using samples from industry in each unit, he can observe that the material can function as an essential part of his technical training. Finally, the student is exposed to a continuous training program in correct and appropriate use of grammar and punctuation. The development of basic English skills, vocabulary, and expository skills will carry over into the following semester.

Second Semester

Prior to this point, I have not mentioned individual text books since there are numerous books on the market that easily lend themselves to the teaching of speech, business letters, and composition. A bibliography of such books is shown in Appendix C. However, for the second semester, I have found three books that seem to be ideally suited for an 18 week course in technical reporting.

The first book is an anthology of technical writers, engineers, and industrial leaders expressing the importance of writing to the technician. Technical and Professional Writing, a Practical Anthology, edited by Herman A. Estrin, answers the question "Why?" for the student and can serve nicely as outside reading material for motivation.

The second book, Practical Speaking for the Technical Man by John E. Dietrich and Keith Brooks, deals with the oral technical reporting that will be covered in this semester. It does give additional speech practices that can be utilized throughout the technician's career, and has been referred to several times in the speech unit for the first semester.

The third book, Technical Report Writing by Rufus P. Turner, has been selected as the basic text because it gives the most practical approach not only to technical writing but also to standarized format. It is further adaptable because it is divided into ten chapters which easily fit the time allotted. In addition, the five larger companies that were shown the book during the interviews endorsed its style and content.

The balance of this chapter will deal with the teaching of technical reporting. Since there is much repetition in oral and written technical reporting, I shall not deal with them as separate units. Rather, I shall give the elements of the report writing process and at the end of the chapter give additional requirements for oral reporting .

The need of technical reporting is evident in several different areas that this report has touched. First, the results of the survey showed that a mean of 49.2% of the technician's time was devoted to actual reporting, while the balance was spent on technical work. Secondly, the volumes of paper work that are in evidence for each major development in science give ample proof of the need of reporting. For example, in the development of an antenna system for the Titan III space booster, there were 13,200 pages of technical reports turned in and printed.[17]

A semester of technical reporting must be preceded by an introductory unit giving the nature of technical writing, its background, types, and style. The anthology listed earlier provides excellent motivation for the opening unit. Mention must also be made of the various attributes, such as clarity, coherence, completeness, confidence, and control. Finally the student must become familiar with the various types of technical reports.

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[17] Rufus P. Turner, Technical Reporting Writing, (New York, 1965), p. XIII.

Another definite unit that must be included is an introduction to the special techniques of technical writing. Primarily this consists of the use of definition, description of mechanism, description of a process, classification, and interpretation.[18] These techniques are not taught as types of reports, for usually several of them are found in a single report. The intermingling of these gives an excellent basis for further development as the semester proceeds. The stress is placed on the practical aspect as well as the theory of these techniques. For example, in teaching the use of the technical definition, some aspect of the practical area the technician is studying might well be defined. Using this definition as an example, the student can give another definition of a closely related object. Another example may be the description of a process by the student in either written or oral assignments. The basic idea of this unit is to lay the groundwork for the formal reports that follow. By examining each technique, the student can identify and classify reports and should be able to understand them better.

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[18] Mills, p. 57.

The next unit involves the anatomy of the technical report. Here the student must be taught the various parts of reports in detail. He must also learn to distinguish between formal and informal reports, and the differences in writing and presenting these two categories.

"A formal report is a full-scale, detailed, tightly structured report....The formal report is always assumed to be a permanent record."[19] With this in mind the instructor must prepare the student for the additional requirements of a formal report, such as a letter of transmittal, cover, cover page, and bibliography, to mention a few.

The informal report differs from the formal report in that it is likely to be shorter, less structured, and often sent in the form of a letter or memorandum, or given orally. Again the major parts of this report differ considerably from those of the formal report, and notice should be taken of these differences.

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[19] Mills, p.34.

The last of the introductory units should give some attention to the memorandum. Even though each company usually has its own form, there are several major features common to all that can be shown and studied. Considering the amount of time that the technician spends in initiating business letters, and the possibility that many of these reports will be in the form of memorandums, it seems advisable to make note of them in this place in the program.

After the student has investigated the various types of reports, he must begin to organize and examine the general procedures for report writing. The student must be made aware that there are set procedures for the preliminary planning, collecting of data, outlining, illustrating, and preparing the final material. He must also be shown the required language of the technical report along with the details of the manuscript mechanics. Since he will receive these elementary details in the introductory unit on report writing, he will be given the practical opportunity to refer to them throughout the semester.

Once the student has become familiar with the terminology of the technical report, he can begin the practical work of the course. To accomplish this, he must naturally follow an organized course of action including establishment of purpose, method, and order of attacking the problem.

He must be fully aware that there are several different approaches in the planning of a technical report that one does not find in the average English research paper. First, a reproduction process must be selected. Since the technical report is often circulated throughout a company and its branches if useful, the question of how many and what kind of copies must be determined. In this unit, then, the student must become familiar with the various instruments for reproduction and the processes involved. A second major difference is in the selection of illustrations for the manuscript. Again, some practical experience or an opportunity to watch professional illustrators and writers collaborate would be of value to the technician. Finally, the technician that turns in a formal report must be taught to allow for approvals of each section and adhere to a definite time schedule.

In sequence, the gathering of materials must follow the preliminary planning. These may be gathered from laboratory or field work, investigations, surveys, interviews or, in some instances, literature reviews. Since factual material is the backbone of technical reports, it is highly essential that the student be given every opportunity to find sources for obtaining this material.

The use of the outline, general writing procedures, writing sequence, and illustrations to support the paper follow in sequence and must be given thorough attention. Since the student has reviewed some of the basic composition skills in the first semester, a transfer of learning should now facilitate the teaching of the writing steps. The keynotes to this process may well be conciseness and clarity. Again, theory alone will not suffice; practical experience in all of these categories must be given. At each step in the sequence of writing the report, time can be taken to allow the student to write and discuss his work in relationship to the concepts being taught.

A substantial unit on the selection and preparing of illustrations warrants comment at this point in the course. As mentioned earlier, the student should be made aware of the processes of reproduction. He should also be made aware of the use of photography, slides, line drawings, graphs, tables, and charts. In addition, he must learn to identify, place, and properly refer to illustrations in the text of the manuscript.

After the manuscript has been roughed out, the student must devote time to revision and rewriting. This offers an opportunity to correct the writing faults involving grammatical, spelling, and punctuation errors. Sentence variety and quality, with emphasis on brevity and consistency, must be reviewed along with the logical development and sequence of ideas.[20] At this time, a review and analysis of footnotes and bibliography entries must be made and necessary corrections taken.

The final step in the writing unit is the polishing of the rough draft. The assembly of material, the placement of illustrations, appendices, pagination, as well as the mechanics of the typing procedure must be stressed. A brief introduction to proofreading for printing can be useful in this section.

The ultimate objective of the writing unit on technical reporting has been the culmination of two semesters of English with a meaningful written project. All of the aspects of good technical reporting have been incorporated in the written report to allow the students to be able to think and communicate logically and concisely. These demands not only meet the demands of industry but also fulfill a basic need of every student. In this instance, they relate to the technical objectives of the school: to train the student for successful employment and to develop his personal traits.

With the high amount of time spent in oral tasks

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[20] Turner, pp. 91-103 .

(Table II, page 23 and Table III, page 24), it is fairly evident that there must be instruction in the presentation of technical reports. The remainder of this chapter will deal with the differences found in the various presentations.

John E. Dietrich and Keith Brooks in their book, Practical Speaking for the Technical Man, list four types of oral presentations: (1) oral summary of a written report; (2) a complete oral report; (3) reading aloud parts of a written report; and (4) reading aloud the entire written report.[21]

Since these are oral reports, the student must be aware of the visual and vocal communicative skills that are needed to give them effectively. He must be skilled in phrasing, giving stress or emphasis correctly, pacing the reading rate, and using visual contact with the audience.

Just as the written report used illustrations, so does the oral report. In this instance, the technical student must be thoroughly familiar with the devices to support his report. Since he has had the basic demonstration speech in the first semester, a transfer of ideas again can be facilitated. A definite portion of this unit must be given to presenting a sample of each of the oral reports listed before. These reports have to be presented with effective visual aids which the student must not only be able to use but also be able to construct and arrange within the speech.

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[21] John E. Dietrich and Keith Brooks. Practical Speaking for the Technical Man. (New Jersey, 1958), pp. 226-228.

Two other types of oral reports should be noted this semester, the interview and the conference report. The use of the interview on a formal or informal basis is in evidence every time the technician gives an oral report to a supervisor, applies for a job, or assists in a sales presentation. Although interviews generally fall into three types: (1) application interview, (2) sales interview, and (3) professional interview, in this unit we are generally interested in the professional interview as it pertains to the presentation of material to a supervisor.[22] Proper preparation, organization, and presentation of ideas are all skills that need to be mastered. The other kinds of interviews deal with information previously covered and should be presented as refreshers if time allows. The conference method of technical reporting should be studied in ways that permit practical experience. The introduction of analytical, investigative, and critical thinking skills in the discussion unit of the first semester should make this practical experience more meaningful to the second semester technical student. Since he has had more exposure to his technical subjects and a better background from which to draw speech or report material, this unit will serve as a culmination to the semester. In giving the oral report from a written technical report done earlier in the semester, the student will utilize both oral and written skills from the entire semester. Again the opportunity to relate the technical material to the academic classroom will enhance the English program and give it a realistic value to the student.

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[22] Damerst, pp. 238-252.

In conclusion, the entire semester of written and oral reporting has been designed to train the student in the expository skills necessary for his future position. My whole research, as well as the philosophy of the program, is geared to meet the demands of industry, summarized by this remark from one of the respondents:

> The technician who is able to speak and write well generally is able to move to a better position--simply because of the impression he makes.

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APPENDIX A

1. Approximately how many of our technical graduates do you employ?

2. In what field is the majority of your technicians working?

3. Do your technicians engage in any of the following areas and for what percentage of their time?

% of time

   A. Originating letters

   B. Writing of Tech. Articles

   C. Reading of Tech. Articles

   D. Oral tasks such as addressing other employees in training sessions, safety meetings, etc. Please describe briefly.

4. Do your technicians have to perform research work that involves:

Oral reporting Length

Written reporting Length

5. Do you have any suggestions of desirable English skills in the technicians you employ?

6. Are there any special communicative skills that are peculiar to your type of business?

7. Additional Comments:

APPENDIX B

LIST OF COMMENTS

Walker Stainless Steel

Our technical people must receive and place phone calls regarding specifications and pricing to customers and potential customers. I believe some training in handling customers by phone may be very useful.

The American Appraisal Company

The ability to communicate clearly, concisely, and to convery the intended meaning can only be developed by practice. Reading widely and writing are the most logical practice media. All writing (not only that completed in English classes) done during the student's academic career should be corrected for "grammar" and returned to the student for review.

Anson & Gelkey Company

As in all other occupations the ability to communicate effectively is important to the individual's advancement and growth in his organization.

Hanscraft Company

I think English is important to communicate ideas necessary for their jobs. A good technician that cannot write or express himself is at a disadvantage in getting other supporting departments such as drafting, etc., to help him reach his objective.

Malleable Iron Range

Our major problems in this area lie in the fact that our technicians cannot write short, informative reports. If the material presented is of any value it contains more words than necessary. We place emphasis on graphic communication through our engineering plans. The drawing being not an end in itself but the beginning of a communique which must be interpreted by vendors, shopmen, methods peoples, etc. (sic)

Damrow

Teach them to express their technical knowledge in laymen's language.

Eau Claire
Ability to clarify thoughts and express them clearly to others many times affects progrers of employees. The correct and proper use of English skills in writing and speaking is essential in any field.

Medina
While our technicians generally have an excellent grasp of the technical aspects of their work, they have difficulty in communicating the results of their activities.

Peter Cooper Corporations
Written reporting: brevity, clarity, stepwise, logical approach, concise summary, definite recommendations. "Who, what, why when, where, how" Oral reporting: Moderate speed, clan, talk modulated, smiling voice and approach, (sic) factual, positive.

Curtis Companies
These students should have the opportunity to write a technical report explaining in detail the results of their findings based primarily on a work experience or problem solving experience.

Franklin
Too many technicians lack the ability to write and read properly. We have some top notch men who neglect their spelling. A broad vocabulary would overcome much of the difficulty encountered in self-expression. A two-year program aimed at developing a vocabulary would work wonders. It need not be massive--just continual.

Amphenol Corporation
The art of both written and verbal reporting seems to be falling into discard. There is great need for additional emphasis on English, particularly in the aspects of business letter writing.

Briggs Transportation
We appreciate your efforts to survey industry as to its needs. Our company does not have technicians of the nature mentioned.

Fox River Paper Co.
Most technical personnel lose out on rapid advancement because of poor presentation of technical data.

APPENDIX C

Arntson, Dorthy Horine, *Beginning College Writing*.

Crouch, W. George and Robert L. Zetler, *A Guide To Technical Writing*.

Dietrich, John E. and Keith Brooks, *Practical Speaking for the Technical Man*.

Estrin, Herman A., *Technical and Professional Writing A Practical Anthology*.

Janis, J. Harold, *Writing and Communicating in Business*.

McCrimmon, James M., *Writing with a Purpose*.

Mills, Gordon H. and John A. Walter, *Technical Writing*.

Monroe, Alan H., *Principles and Types of Speech*.

Robinson, Karl F., *Teaching Speech in the Secondary School*.

Turner, Rufus P., *Technical Report Writing*.

Outline of Course Content

APPENDIX D

Unit No.	Time in Hours	Unit Description	Unit Objectives (Understanding, appreciations and skills to be developed in terms of learning)
1	2	Introduction	To show the student importance of speech. (Refer to thesis) To make students awnre of ethical values of speech. To pass out personal data sheet and assign its return for following meeting To give "icebreaker" speech. To announce assignments for the unit. SKILLS OR CONCEPTS A. Ethics of Speech. 1. Truth. 2. Facts vs. opinion. 3. Good taste. B. Personal value of each speech. 1. Responsibility to class. 2. Responsibility to self.
2	2	Listening	To learn to listen effectively for enjoyment, information, and critical understanding. To learn to evaluate audience reactions. To improve listening habits. (Ref: Robinson--Kerikas, p. 264) SKILLS A. Listen effectively in the following situations: 1. Member of an audience. 2. Person-to-person. 3. Classroom B. To gain improvement of Nichol's Ten Worst Listening Habits. 1. Calling the subject uninteresting. 2. Criticising the delivery. 3. Getting overstimulated. 4. Listening only for facts. 5. Trying to outline everything. 6. Faking attention. 7. Creating or tolerating disturbances. 8. Avoiding difficult expositor materials. 9. Letting personal prejudices interfere. 10. Wasting the advantage of thought speed.

Outline of Course Content

Unit No.	Time in Hours	Unit Description	Unit Objectives (Understanding, appreciations and skills to be developed in terms of learning)
3	3	Speech preparation and content.	To be able to prepare a speech for effective delivery. To develop the speech with logic and clarity. (Ref: Monroe, p. 285) SKILLS A. To prepare a speech by: 1. Analysis of audience and occasion. 2. Choice of subject. a. interest to speaker and audience. b. limited topic. c. appropriate topic. 3. Gathering of material. a. sources. b. library. 4. Arrival at thesis sentence. 5. Outlining. 6. Organization of material. B. Plan speech content with: 1. Introduction. a. attention getter b. definition of terms c. background 2. Body a. main points. b. sub-topics. c. supporting facts. d. method of organization 3. Conclusion. a. summary of main points b. emphasis of major poin
4	2	Delivery--Bodily action.	To be able to use bodily action for maximum results in speech delivery. To aid student in bodily control, ease, coordination and vitality of motion. SKILLS Improve speech delivery with: A. Audience contact. B. Visual contact. C. Mental attitude. D. Movement 1. To platform. 2. During speech. 3. From platform.

Outline of Course Content

Unit No.	Time in Hours	Unit Description	Unit Objectives (Understanding, appreciations and skills to be developed in terms of learning)
			E. Gestures. 1. Conventional. 2. Disciplined. F. Facial expressions. G. Characteristics of gestures. 1. Relaxation. 2. Vigor. 3. Definiteness. 4. Timing. H. Six basic types of gestures. 1. Pointing. 2. Giving or receiving. 3. Rejection. 4. Clenched fist. 5. Caution. 6. Division.
5	2	Vocal Communication	To improve the quality of the voice. SKILLS Learn and improve the following: A. Physical characteristics of voice 1. Breath control. 2. Thinness, weakness. 3. Huskiness, harshness. 4. Emotional control B. Vocal Variety. 1. Volume 2. Rate a. pause. 3. Force a. degree. b. form. c. stress. 4. Pitch. a. key. b. steps and slides. C. Language. 1. Usage (effective word choice 2. Articulation.
6	12	Speech to Inform	To learn how to present material in an understandable manner. To learn to listen critically to student speeches and instructions. (Ref: Monroe, pp. 3 to 388) SKILLS A. Identify three types of informativ speech.

Outline of Course Content

Unit No.	Time in Hours	Unit Description	Unit Objectives (Understanding, appreciations and skills to be developed in terms of learning)
			1. Reports. 2. Instructions. 3. Lectures.
		A. Speech to explain.	Student must give a five-minute speech to explain using the following principles: A. Characteristics of content. 1. Clarity. a. logic. b. transitions. c. major premise supported. 2. Concreteness of language. 3. Variety of language. 4. Contrasts. B. Organization 1. Attention step. 2. Need step. 3. Satisfaction step.
		B. Speech to demonstrate.	Student must give a five-minute demonstration by using an apparatus or visual aid from his field. For example, an electronics student might demonstrate a transistor. In addition to steps A and B above student must be able to: C. Use visual aid. 1. Mechanical device. a. clear. b. vivid. c. meaningful. d. working order. 2. Progressive explanation. In both classroom situations the student must listen critically to the other student speeches and find: A. Strengths and weaknesses of presentations. B. Flaws in instructions or explanations.

Outline of Course Content

Unit No.	Time in Hours	Unit Description	Unit Objectives (Understanding, appreciations and skills to be developed in terms of learning)
7	12	Speech to persuade.	To learn to strengthen or create beliefs, attitudes, or feelings. To listen critically. To be able to gain action through these beliefs, attitudes, or feelings.
		A. Speech to stimulate.	To learn to use speech to stimulate as it applies to technical sales. (Ref: Monroe, pp. 389-410) Skills Student must give a five-minute speech to stimulate to either gain action or stimulate a belief, feeling, or attitude using the following: A. Characteristics of content. 1. Striking phraseology. 2. Slogan or Keynote. 3. Concrete and specific language. 4. Contrasts. 5. Motivation. 6. Imagery. a. visual. b. auditory. c. gustatory. (taste) d. olfactory. (smell) e. tactual. 1. pressure. 2. texture, shape. 3. heat and cold. B. Motivational Sequence. 1. Attention step. 2. Need step. 3. Satisfaction step. 4. Visualization step. 5. Action step. C. To listen to speech development and be able to identify steps in organization.
		B. Speech to convince.	Student must give a five-minute speech to simulate working conditions using following skills. SKILLS A. Understanding of propositions. B. Determine criteria upon which judgement is based. C. Identification of types of propositions through: 1. Research. 2. Critical listening.

Outline of Course Content

Unit No.	Time in Hours	Unit Description	Unit Objectives (Understanding, appreciations and skills to be developed in terms of learning)
			D. Use characteristics of content. 1. Concrete facts and examples. 2. Logical reasoning. a. deductive. b. inductive. c. casual. d. use of axioms. e. establishment of proof. E. Be aware of the ethical values of speech to convince. 1. Interest in others. 2. Recognition of others. 3. Warm personality. 4. Show of character by language. F. Use of suggestions. 1. Positive. 2. Negative. G. Use of methods of organization. 1. Problem-solving. 2. Direct or indirect. 3. Yes-response. 4. This-or-nothing. 5. Common-good. 6. Tried and proven. H. Be able to react to the audience. 1. Friendly. 2. Hostile. 3. Indifferent.
	4	Discussion. Note: To be presented if time allows, since a form of discussion will be given in the oral reporting unit.	To improve skills of analysis, problem-solving, and group participation. (Ref: Robinson, p. 190 Monroe, pp. 548-582.) SKILLS Participate in a round-table discussion in groups of four students plus a student leader. A 30 minute discussion period will be followed by a short question and answer session. A. Be able to identify the various forms of discussion. 1. Round-Table (committee). 2. Panel. 3. Symposium. 4. Lecture-Forum. B. Be aware of the general goals of discussion. 1. Exchange of ideas or opinions.

Unit No.	Time in Hours	Unit Description	Unit Objectives (Understanding, appreciations and skills to be developed in terms of learning)
			2. Reach an agreement. 3. Make decisions. C. Use essentials of good discussion. 1. Order. 2. Critical listening and exchange of ideas. 3. Qualities of leadership. D. Use different steps in discussion to 1. Define problem. 2. Analyze problems. 3. Suggest solutions. 4. Evaluate solutions. 5. Put solution into effect. E. For participants: 1. Begin discussion effectively. 2. Keep it on track. 3. Bring out all the facts. 4. Arrive at profitable solutions. 5. Be alert and listen.